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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/614,511	07/11/2000	Wanda Andreoni	CH-1999-0004US1	2057

7590

08/26/2002

Ference & Associates
129 Oakhurst Road
Pittsburgh, PA 15215

EXAMINER

XU, LING X

ART UNIT

PAPER NUMBER

1775

13

DATE MAILED: 08/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-13

Office Action Summary	Application No. 09/614,511	Applicant(s) ANDREONI ET AL.	
	Examiner Ling X. Xu	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/22/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/22/2002 has been entered.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. The claimed subject matter is a compound substituted in the 3- or 4-position of the base unit with electron-donor group and substituted in the 5-position of the base unit with electron-acceptor or p-delocalizing group. Figure 1 shows only the base unit of the compound without any substituents. Therefore, the substituents of the claimed compound in the 3- or 4- and 5- position of the base unit must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 112

3. Claims 15-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 15 and 19, it is unclear if "zone" is the same as "layer". It is also unclear if the luminescent layer is a separate layer or a layer within either hole injecting and transporting zone or electron injecting and transporting zone.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (US 4,885,211) in view of Moore et al. (US 5,484,922).

Tang discloses that an EL device comprises an anode, an organic luminescent medium with at least two separate organic layers, and a cathode (Col. 4, lines 44-50). The organic luminescent medium contains at least two separate organic layers, such as hole transporting zone and electron transporting zone (Col. 10, lines 48-67). Tang also discloses that the organic electron transporting zone contains tris(8-quinolinol)aluminum Alq₃ (Col. 16, lines 1-45) as luminescent materials. The electron transporting zone also functions as luminescent layer.

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Tang does not disclose that Alq₃ is substituted in 3- or 4- position with electron-donor group and in 5-positions simultaneously with an electron-acceptor or p-delocalizing group.

Moore teaches the use of substituted aluminum chelate compound in an EL device (Col.5, lines 45-67). The substitutes may be made in all six positions including 3-, 4- and 5-positions of the quinoline ring [Col. 5, formula (III)].

Moore also teaches that substituents on the 8-quinolinolato rings can also perform useful hue shifting functions. The quinoline ring consists of fused benzo and pyridino rings. When the pyridino ring component of the quinoline ring (2, 3, and 4 positions of the quinoline ring) is substituted with one or more electron donating substituents the effect is to shift the hue of emission to lower wavelength (Col. 6, lines 59-67). When any or all the benzo ring components of the quinoline ring (5,6,and 7 positions of quinoline ring) is substituted with electron accepting substituents the effect is to shift the hue of emission to shorter wavelengths (Col. 7, lines 10-20). Moore lists the possible substituents as electron donating and accepting substituents, such as – CH₃, -CF₃, -CH₃, -OCH₃, -OC₂H₅ (Col. 7-10).

Therefore, absence of showing unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the claimed substituted Alq₃ compound for Tang's EL device, because Moore disclose the use of same or similar substituents on the 8-quinolinolato rings can perform useful hue shifting functions.

Moore does not specify every claimed substitute, such as $\text{CF}=\text{CF}_2$, however, Moore lists substitutes that have same or similar structure as the claimed substitutes, such as hydrogen, hydrocarbon groups contain 1-10 carbon atoms, amino, cyano, halogen, and α -haloalkyl substituents, etc. (Col. 5, lines 60-67). Moore also specifies the possible substituents as electron donating and accepting substituents, such as $-\text{CH}_3$, $-\text{CF}_3$, $-\text{CH}$, $-\text{OCH}_3$, $-\text{OC}_2\text{H}_5$, $\text{CH}=\text{CCl}_2$ (Cols. 7-10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the claimed Alq_3 compound with substitutes, such as $\text{CF}=\text{CF}_2$, in Tang's EL device because Moore discloses the use of same or similar substituents on the 8-quinolinolato rings. One skilled in the art would have been motivated to use the compound with expectation that similar compound in structure will have similar properties and same utilities.

6. Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al and Moore et al. as applied to claims 1-14 above, and further in view of applicants admission.

As stated above, Tang and Moore disclose the use of substituted Alq_3 in an EL device.

Tang and Moore disclose a two-layer structure wherein an electron transporting layer having both light emitting properties and electron transporting properties. Tang and Moore do not disclose that the EL device has a luminescent layer in addition to the hole injecting/transporting zone and an electron injecting/transporting zone. However, it

is well known in the art that an EL device having a three-layer DH structure and two-layer SH-A and SH-B structures, depends on where the emissive layer is positioned. It is also supported by Applicants' statement in the Specification (Page 8, lines 4-10) that the organic EL device could have two (also page 1, lines 17-20) or three layers structure in addition to the electrodes. Both three-layer and two-layer EL device have the same functions including hole injecting/transporting, light emitting, and electron injecting/transporting. In the two-layer structure, one layer may function more than one function, such as hole injecting/ transporting and light emitting functions (the SH-A type) or light emitting and electron injecting/ transporting functions (the SH-B type) to obtain the same electroluminescent effects as the three-layer (the DH type).

Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to add a separate light emitting layer or to make a three-layer structure to Tang's and Moore's EL device since it is well known in the art, and also supported by applicants' admission, that an EL device can have either two- or three-layer structure depends on where the light emitting layer or zone is positioned, both two- or three-layer structure have the same electroluminescent effects.

Response to Arguments

5. Applicant's arguments have been fully considered but they are not persuasive.

With respect to the drawing, the Examiner maintains that the drawing must show every feature of the invention specified in the claims. Figure 1 does not show any feature of the invention specified in the claims. The compound shown in Figure 1 is a

well-known compound and has been used in the electroluminescent field for more than a decade. It is suggested that the Figure be labeled as "prior art" or changed to include the features of the invention specified in the claims.

6. With respect to the rejection based on Tang and Moore under 35 USC 103(a), applicants argue that there is no suggestion or motivation to combine the two references because Tang does not teach or suggest modifying the relevant electron states through specific substitutions on the quinolate ring. The Examiner disagrees. The combination of Tang and Moore teach the claimed invention.

As stated in the prior Office action, Tang discloses that EL device comprises tris (8-quinolinol) aluminum as luminescent materials. Tang does not disclose that Alq_3 is substituted in 3- or 4- position with electron-donor group and in 5-positions simultaneously with an electron-acceptor or p-delocalizing group.

Moore teaches the use of substituted aluminum chelate compound in an EL device. The substitutes can be made in all six positions including 3-, 4- and 5-positions of the quinoline ring [Col. 5, formula (III)]. Moore also teaches that substituents on the 8-quinolinolato rings can also perform useful hue shifting functions. Moore lists the possible substituents as electron donating and accepting substituents, such as $-\text{CH}_3$, $-\text{CF}_3$, $-\text{CH}$, $-\text{OCH}_3$, $-\text{OC}_2\text{H}_5$ (Col. 7-10).

Therefore, it would have been obvious to one of the ordinary skill in the art to use Alq_3 substituted in 3 or 4 and 5-positions with certain electron donating or accepting groups in order to perform useful hue shifting functions, as suggested by Moore.

Applicants also argue that Moore teaches away from the present invention because Moore states that the 3- position on the quinolate ring of the compound has a relatively small influence on the hue of emission. Arguments are not commensurate in scope with the claims. Because the claims recite both 3- and 5- position has to be substituted or both 4- and 5- positions have to be substituted. There is no disclosure in the claims or specification whether the 3-position substituent has a relatively small influence on the hue of emission than any other positions. Even if the present application claims that the 3-position should not have a relatively small influence on the hue of emission, because the term "or" is used in the claim language, the combination of Tang's and Moore's references still reads on the alternate limitations of both 4- and 5- positions being substituted.

Applicants also argue that Moore discloses that, when the quinoline ring is substituted with one of more electron donating or electron accepting substituents, the effect is to shift the hue of emission to a lower or shorter wavelengths. Applicants argue that the emissions of the claimed compounds, however, are not shifted to the lower or shorter wavelengths which are supported by the newly submitted charts entitled "Ligand substitution modifies the optical spectrum" and "Alq3 derivatives with improved luminescence efficiency."

If applicants' intent is to show that the claimed compounds exhibit properties that are unexpected, an affidavit or declaration signed by the applicants is required since the data shown in the newly submitted charts were not provided in the specification before. It should also be noted that the data in the charts are related to substitutes of -OH and

–CX=CX2, it is unclear if other substitutes recited in the claims also show similar unexpected properties.

The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Examples of attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration include statements regarding unexpected results, commercial success, solution of a long-felt need, inoperability of the prior art, invention before the date of the reference, and allegations that the author(s) of the prior art derived the disclosed subject matter from the applicant. See MPEP 716.01(c).

7. With respect to the rejection of claims 15-22, as stated in the prior Office action, the Examiner maintains that it is well known that an EL devices can have a three-layer DH structure and two-layer SH-A and SH-B structures and exhibits the same electroluminescent effects. For example, US 5,382,477 (Col. 1, lines 40-67), US 5,597,925 (Col. 2, lines 10-67), and US 5,709,959 (Col. 1, lines 15-67) all disclose that EL devices having two or three layers structure between the electrodes are conventional and have the same electroluminescent effects. It is also supported by Applicants' statement in the Specification (Page 8, lines 4-10) that the organic EL device could have two or three layers structure in addition to the electrodes.

Applicants also argue that the cited references above do not disclose the claimed compounds. Applicants argument is not fully responsive to the prior Office because the three cited references above are only used as examples, in addition to Tang, Moore and

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applicants' admission, to support the Examiners statement that it is well known in the art that the organic EL devices can have two or three layers structure between the electrodes and have the same electroluminescent effects. No new ground of rejection was made to the claimed compounds based on these three cited references in the prior Office action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 703-305-0395. The examiner can normally be reached on 8:00 - 4:30 Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 703-308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


DEBORAH JONES
SUPERVISORY PATENT EXAMINER

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August 22, 2002